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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,134	12/03/2001	Jeong Soo Kim	2332-0117P-SP	4564

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EXAMINER

PHAM, THANH V

ART UNIT PAPER NUMBER

2823

DATE MAILED: 04/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/998,134

Applicant(s)

KIM ET AL.

Examiner

Thanh V Pham

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 4-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-2 and 4-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/03/03 has been entered.

### ***Claim Objections***

2. Claim 5 is objected to because of the following informalities: "4x10<sup>12</sup>" needs a unit such as "ion/cm<sup>2</sup>" because a number without unit cannot be understood. Appropriate correction is required.

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-2 and 4-15 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-2 and 4-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheek et al. U.S. Patent No. 6,372,587 B1.

The Cheek et al. reference discloses a method for forming a junction in a semiconductor device comprising:

providing a semiconductor substrate 105 divided into a first conductive type nMOS region and a second conductive type pMOS region (col. 9, line 66 to col. 10, line 12);

forming a photoresist film 510 on the second conductive type MOS region;

performing 'first' halo implant on the first conductive type MOS region at about a 25-65° tilt angle (col. 6, line 49) and

performing a 'third' halo implant process 1200 (fig. 12) on the first conductive type MOS region, by using a tilt angle of about 0°.

The first halo implant is performed with an energy of 5-70 KeV and a dose of  $1.0 \times 10^{12}$  -  $1.0 \times 10^{14}$  ions/cm<sup>2</sup>; the third halo implant process is performed with a dose of  $1.0 \times 10^{14}$  -  $1.0 \times 10^{15}$  ions/cm<sup>2</sup> and with an energy of 3-50 KeV (col. 3, lines 27-38).

The Cheek et al. reference, in its invention does not use the 'second' halo implant (as labeled in claim 8 or the second part of the first implant as named in claim 1) at twist angles of about 0° and 180° with an energy of 5-70 KeV and a dose of  $1.0 \times 10^{12}$  -  $1.0 \times 10^{14}$  ions/cm<sup>2</sup>; however, in the description of the related art, col. 2, line 66 to col. 3, line 3, the technique is mention<sup>ed</sup><sub>ed</sub>.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply this 'conventional halo implant' with twist angle to improve the short-channel effect because this 'second' implant would reinforce the doping type of the substrate in the channel for the S/D extension and the LDD as taught by Cheek et al.


### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh V Pham whose telephone number is 703-308-2543. The examiner can normally be reached on M-T (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

  
George Fourson  
Primary Examiner

TvP  
April 17, 2003